

Improved PCB Layouts for Video RAM-DACs Can Use Either PLCC or DIP Package Types

by Bill Slattery

This application note describes printed circuit board layout schemes for the video RAM-DAC portion of a VGA compatible graphics card. The layouts allow either of two package types to be accommodated on one PCB. The user has the option of choosing either the 28-pin DIP 171/176 video DAC or the superior ADV471 which comes in a small 44-pin PLCC package. PCB patterns for two different types of layout are illustrated in this application note. The difference between the two layouts lies in the way in which the ADV471 PLCC is mounted on the board. The board designer has the option of either surface mounting or socket mounting the ADV471.

PLCC SURFACE MOUNT

Figure 1 illustrates how the PLCC can be directly surface mounted on the 28-pin DIP footprint. This is done by choosing a pin which can be used as a common point to both the DIP and PLCC pinouts. In this PCB design, Pin 1 (No Connect "NC") of the PLCC and Pin 24 (D7) of the DIP are the chosen coincident pins. The choice of these two pins as the common point optimizes board space as well as avoiding any manufacturing or solderability

problems. This is ensured by selecting Pin 1 of the PLCC as the common pin. Pin 1 of the ADV471 is not internally connected within the package thus avoiding the need for it to be soldered onto the circular pad corresponding to Pin 24 of the DIP. Figure 1 is an X-ray view of the pattern showing both the component and solder (dotted-line traces) sides. It also indicates the DIP pin functions as well as some of the PLCC pin numbers. Figures 3 and 4 show the actual layout patterns for both the component side and solder side of the PCB.

PLCC SOCKET MOUNT

The designer can use a standard socket mount configuration for the PLCC, as shown in Figure 2. The PLCC is positioned with pin "D2" of both the DIP and PLCC sockets adjacent to each other. The PLCC socket recommended for use with this layout is available from AMP, part number 641747. Figures 5 and 6 give the PCB layout patterns for both the component side and solder side.

Note: PCB layouts on page 2 of this application note are at a scale of 2:1.

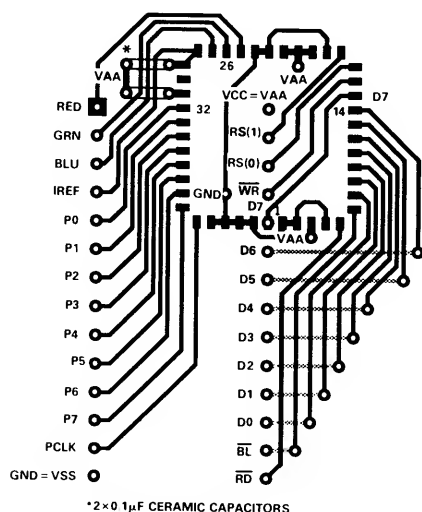


Figure 1. X-Ray View of Layout Using Surface Mounted PLCC

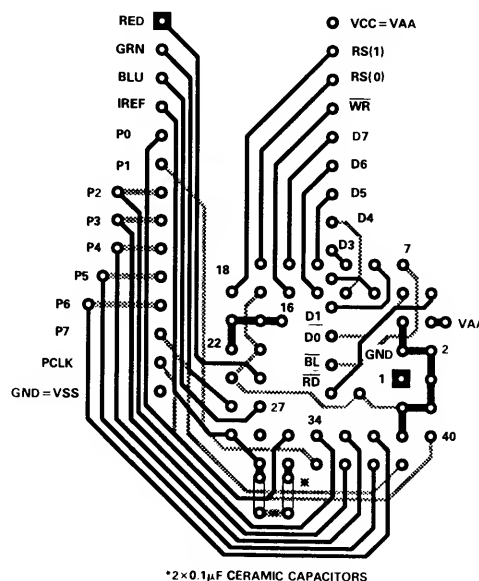


Figure 2. X-Ray View of Layout Using Socket Mounted PLCC

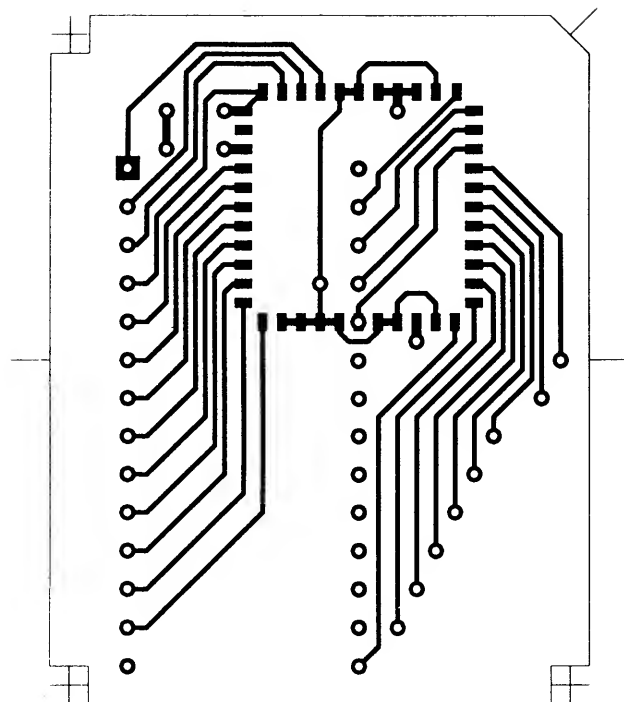


Figure 3. PCB Component Side Layout Pattern Using Surface Mounted PLCC

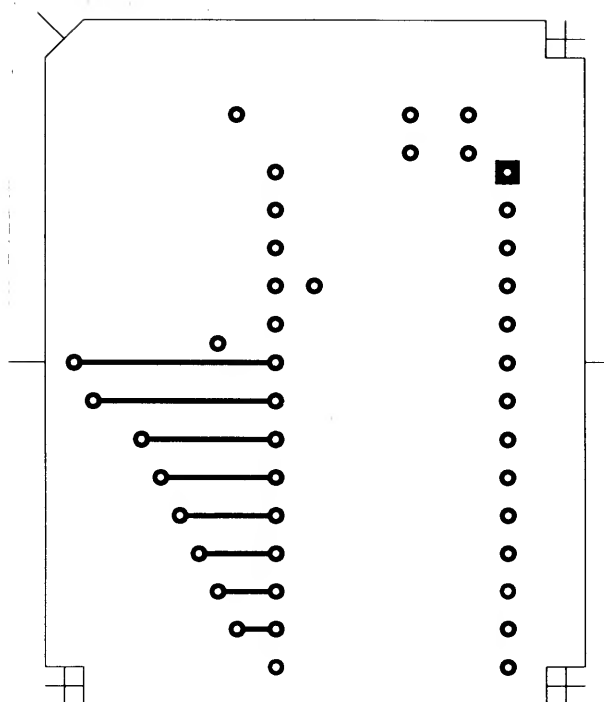


Figure 4. PCB Solder Side Layout Pattern Using Surface Mounted PLCC

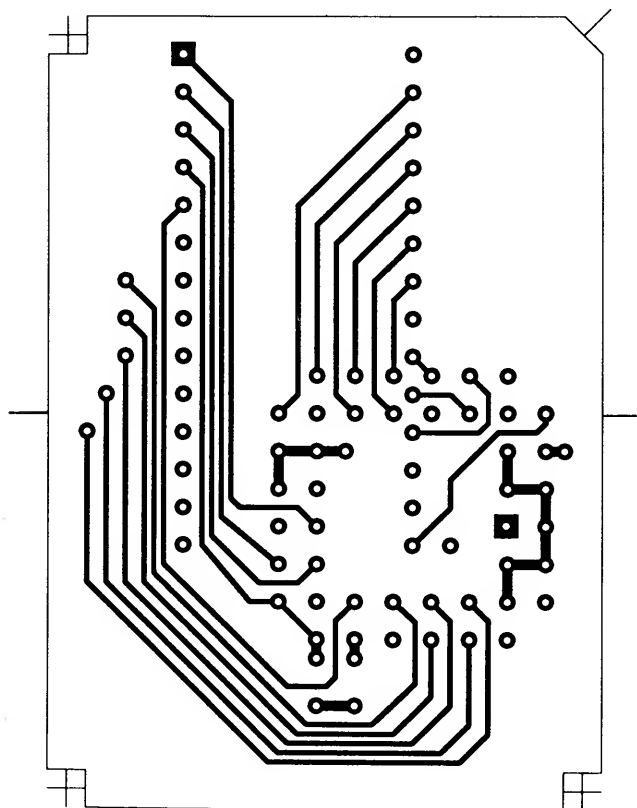


Figure 5. PCB Component Side Layout Pattern Using Socket Mounted PLCC

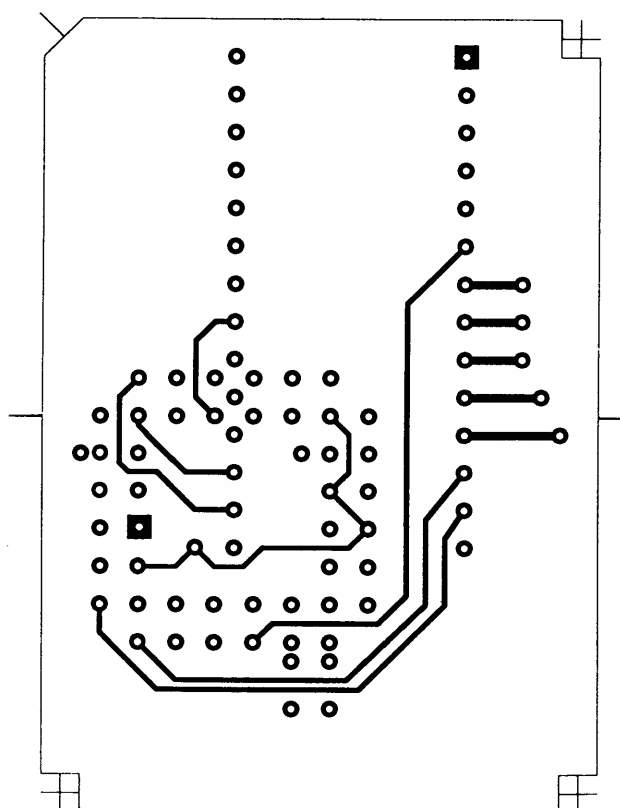


Figure 6. PCB Solder Side Layout Pattern Using Socket Mounted PLCC

LAYOUT CONSIDERATIONS

For optimum performance, the majority of PCB traces on both layouts vary between 12 and 15 mils, except in some cases where ground and power planes vary between 20 and 25 mils. The circular pads used are 42 mils

in diameter on 28 mil diameter plated-through holes. Rectangular 55×36 mil surface mount pads are used for the PLCC surface mount option. Spacing between traces and pads for the analog circuitry is optimized to that required for a 75Ω transmission line.